

TWO NEW SPECIES OF *ERIASTRUM* (POLEMONIACEAE) FROM CALIFORNIA

David Gowen

111 Roble Road
Oakland, California 94618, U.S.A.
1davidgowen@gmail.com

ABSTRACT

Eriastrum ertterae D. Gowen, known only from the Lime Ridge area of Contra Costa Co., and ***Eriastrum rosamondense*** D. Gowen, endemic to the Rosamond Dry Lake area north of Lancaster, are described as new. Prior collections of both species have been referred to *E. hooveri* in the past, but differ in flower color, stamen size and position, as well as their distinctive geographic locations.

RESUMEN

Se describen dos nuevas especies de *Eriastrum*: ***Eriastrum ertterae*** D. Gowen, conocida sólo en el área de Lime Ridge en el condado de Contra Costa, y ***E. rosamondense*** D. Gowen, endémica del área de Rosamond Dry Lake al norte de Lancaster. Colecciones previas de ambas especies han sido referidas a *E. hooveri* en el pasado, pero difieren de esta última por el color de las flores, el tamaño y la posición de los estambres, como así también por su particular ubicación geográfica.

KEY WORDS: endemic species, *Eriastrum hooveri*, Lancaster, Lime Ridge, rare plant, Rosamond

The genus *Eriastrum*, comprising 16 species from western North America, all of which occur in California, was most recently treated by De Groot et al. (2012). The purpose of the current paper is to provide names for two of the several unnamed taxa mentioned therein, both previously identified as *E. hooveri* (Jeps.) H. Mason.

Eriastrum hooveri, with corollas 5–6 mm in length, is one of the smallest flowered members of the genus. The stamens are included and usually do not reach the corolla lobe sinus. Depending on flower size, *E. hooveri* has stamens 1–1.5 mm long, inserted slightly more than that length below the sinus. The flowers are always white. The only other species with corollas nearly as small is *E. abramsii* (Elmer) H. Mason. These two species are easily distinguished from each other by a variety of characters, including leaf and bract lobe number, the amount and location of woolly pubescence, flower color, and stamen length and position. *Eriastrum abramsii* and both of the two new species proposed in this paper have corollas that are pale blue, or have blue streaking. Although many *Eriastrum* species can be recognized by vegetative or flower size and color characters, perhaps the most important diagnostic characters involve stamen length and position (Mason 1945; Harrison 1959, 1968).

The seemingly minute stamen differences between these *Eriastrum* with small corollas, is more readily apparent than the measurements would suggest. Splitting the corollas lengthwise and observing with a microscope works well. I have also found that collecting corollas into a clear plastic sandwich bag, and placing this in a plant press until dry, is useful. This allows one to simply hold the bag up to the light and observe the arrangements of the flower parts with a hand lens.

TAXONOMIC TREATMENTS

Eriastrum ertterae D. Gowen, sp. nov. (**Fig. 1 A–E**). TYPE: U.S.A. CALIFORNIA, Contra Costa Co.: Lime Ridge Open Space, S of summit near power line area, 1 Jul 2005, Gowen 471 (HOLOTYPE: JEPS; ISOTYPE: BRY).

Differing from *E. hooveri* by having larger corollas tinted with blue (rather than white), stamens attached lower in the tube, and anthers reaching the corolla lobe sinus or beyond (rather than included and generally not reaching the corolla sinus).

Plants erect annuals, 1.5–20(–25) cm; stems simple or branching, internodes 0.5–3 cm; herbage lightly floccose. **Leaves** light green, to 3 cm long, subulate-awn tipped, with one pair of lateral lobes or entire, lobes 2–8 mm long. **Inflorescences**: heads 1 to few, floccose, 0.5–1.0 cm long excluding tips of bracts; bracts to 1.4 cm long, exceeding heads, with 1 pair of lateral lobes. **Calyx** 4–7 mm long, densely woolly, lobes unequal, tips not obscured by trichomes. **Corolla** regular, sub-salverform, 5–7 mm long, throat plus tube 3–5 mm long, lobes appearing almost white but with pale blue tint or blue streaking, elliptic-acute, 2 mm long, 1 mm wide. **Sta-**

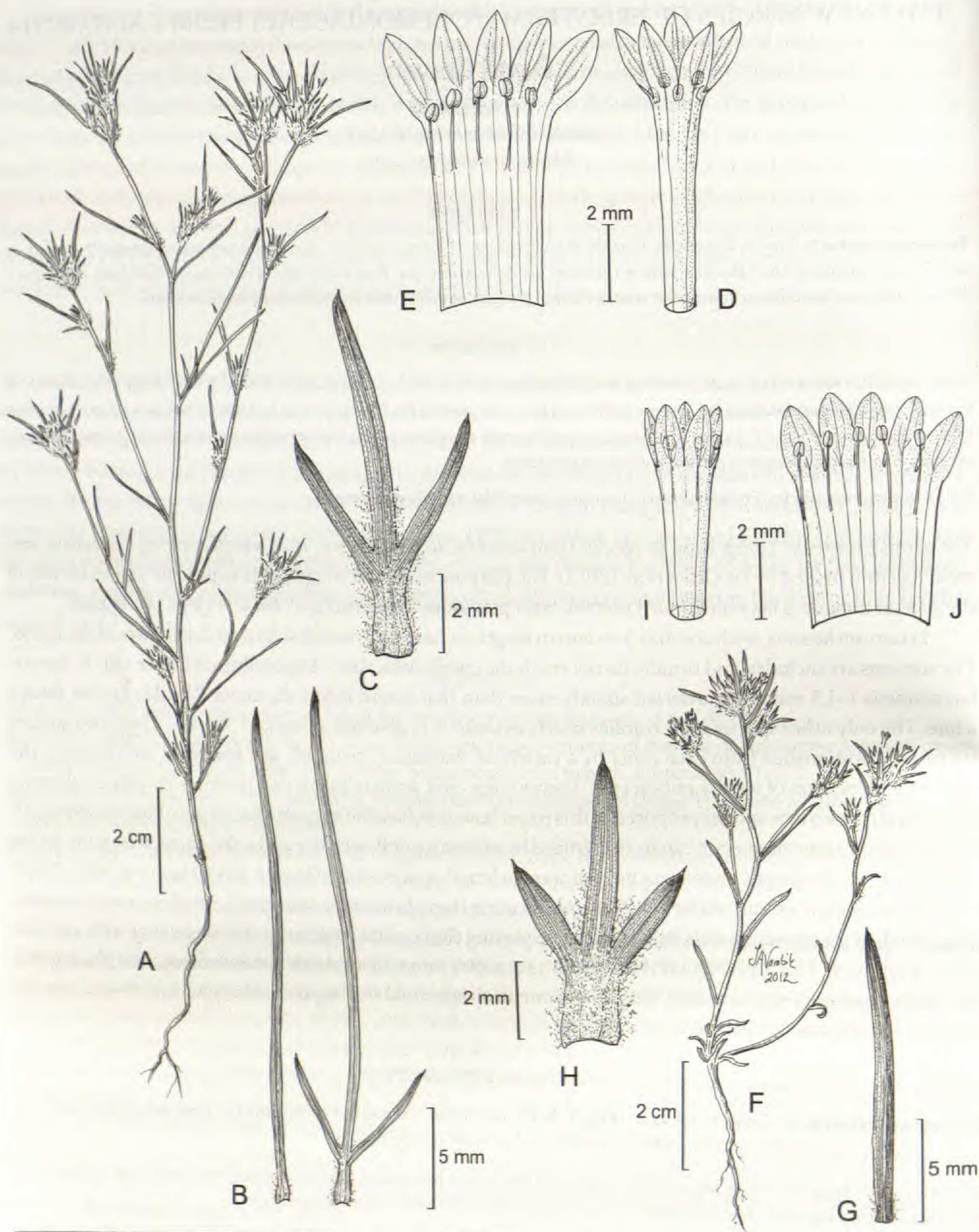


FIG. 1. (A–E). *Eriastrum ertterae*. A. Habit. B. Leaves. C. Bract. D. Corolla. E. Dissected corolla. (F–J). *Eriastrum rosamondense*. F. Habit. G. Leaf. H. Bract. I. Corolla. J. Dissected corolla.

mens 1.5–2.5 mm long; filaments 1.25–2 mm long, sinus to stamen insertion 2 mm; anthers versatile, cordate, 0.3–0.5 mm long, reaching the corolla lobe sinus and usually exserted just beyond. **Style** ca. 2.5 mm long, stigmas 0.25–0.5 mm long. **Capsule** 4 mm long, 2 mm wide, 3-loculed, each locule 2–4 seeded.

PARATYPES: U.S.A. CALIFORNIA. Contra Costa Co.: Lime Ridge Open Space [all collections]: in saddle SE of microwave towers on summit, 18

Oct 1998, Ertter 16441 with Morosco (UC); near transmission tower, 14 Jun 2003, Gowen s.n. (JEPS); E side of hill 724, 5 Jun 2005, Gowen 404 (JEPS); power line area, 6 Jul 2005, Gowen 472 (JEPS).

Distribution and habitat.—Lime Ridge Open Space, slightly northwest of Mt. Diablo, between the towns of Clayton and Walnut Creek, is the only known location for *E. ertterae*. There are three small sites where the plant grows, distant from each other by 0.2–0.7 km. It grows in fine sandy soil in openings or the edges of the chaparral. Depending on weather patterns for any given year, each site might only have several hundred to possibly a thousand plants, making *E. ertterae* a plant of obvious conservation concern.

Discussion.—Until relatively recently, *Eriastrum* was nearly unknown in Contra Costa County. There are two historic records for *E. pluriflorum* (A.A. Heller) H. Mason, one from the late 1800s, and one from 1933, but no known extant populations. There is also a historic Brandegee collection of *E. sapphirinum* (Eastw.) H. Mason, most likely with erroneous location data, that was more likely collected in southern California (Brandegee collections with erroneous locality information are, unfortunately, common). It has only been within the last two decades that *E. abramsii* was found at two locations approximately 5 and 8 km east of the summit of Mount Diablo (Gowen 12 and 609).

It was therefore a surprise in June 2003 to find an *Eriastrum* at Lime Ridge, about 8 km northwest of Mount Diablo, while searching for a perplexing *Navarretia* I had seen there many years before. A review of the supplement in the just-published updated flora of Mount Diablo (Ertter & Bowerman 2002) revealed that Barbara Ertter and Tony Morosco had collected dried fruiting plants (not identifiable to species) from the same locality in 1998. Unfortunately, fresh flowering material was no easier to determine, as it didn't fit well with any described species. Several years of additional fieldwork, morphological analysis, and common garden experiments have confirmed that this extremely localized entity is a distinct taxon.

Eriastrum ertterae is most similar to *E. hooveri*, but has more robust corollas (size and texture), with a pale blue tint or streaking on the lobes. The stamens are longer, and the position of the anthers relative to the corolla lobe sinus differs; *E. ertterae* has anthers placed at, or just beyond the sinus. The attachment point of the filament is almost at the mid distance of the total corolla length. By comparison, *E. hooveri* has corolla lobes that are proportionally longer to the total length of the corolla. Because the stamens are shorter and included, the anthers are placed not far beyond the mid length of the corolla. Geographically, *E. ertterae* is separated from the closest population of *E. hooveri* in the Panoche Hills of western Fresno County by approximately 160 km.

Blooming time was found to differ between *E. ertterae* and *E. hooveri*, both in the field and with plants grown under common garden conditions by the author in Oakland, California. The first flowers to appear on *E. ertterae* were almost a month later than for *E. hooveri*, which were grown using seeds collected from representative populations throughout its entire range.

Etymology.—The specific epithet honors Barbara Ertter (b. 1953), the taxon's first collector, in appreciation for the encouragement and guidance that she has given me over many years. For all the energy she has focused on the local Bay Area flora, it is only fitting to have a very local plant named in her honor.

Eriastrum rosamondense D. Gowen, sp. nov. (**Fig. 1 F–J**). TYPE: U.S.A. CALIFORNIA. Los Angeles Co.: NW of Lancaster at the SW quadrant of West Avenue D and 30th St. West, 12 May 2010, Gowen 1110 (HOLOTYPE: JEPS; ISOTYPE: BRY).

Differing from *E. hooveri* by having corollas pale blue (rather than white), and stamens exerted almost half the corolla lobe length (rather than included). Differing from *E. diffusum* by having smaller flowers, and leaves entire (rather than leaves mostly with one pair of lateral lobes).

Plants erect to spreading annuals, 2–8(–11) cm; stem simple or branching, usually from the base, internodes to 1.5 cm; herbage and stems lightly floccose to glabrescent. **Leaves** light green, to 1.5 cm long and 1 mm wide, subulate-awn tipped, entire. **Inflorescences:** heads 1 to few, floccose, 4–7 mm long excluding tips of bracts; subulate-awn tipped, entire. **Calyx** 5 mm long, dense-bracts 4–14 mm long, with 1 pair of lateral lobes 3–4 mm long, these often recurved. **Corolla** regular, sub-salverform, 5–6(–7) mm long, throat plus tube ca. 4 mm long, lobes pale blue but sometimes appearing almost white, lobes elliptic-acute with tips sometimes slightly rounded, 1.5–2(–2.5) mm long and 0.9 mm wide. **Stamens** 2–2.5 mm long; filaments ca. 2 mm long, sinus to stamen insertion 1 mm; anthers versatile, cordate, 0.25–0.5 mm long, exerted to near or slightly beyond the mid-length of the corolla lobe. **Style** ca. 3 mm long, stigmas ca. 0.3 mm long. **Capsule** ca. 4 mm long, 2 mm wide, 3-loculed, each locule 2–4 seeded.

PARATYPES: U.S.A. CALIFORNIA. Los Angeles Co.: Lancaster, 11 Jul 1892, Davidson s.n., in part (RSA); Lancaster, May 1909, Brandegee s.n. (UC); border of alkali flat, Lancaster, 29 Apr 1930, Hoffman s.n. (CAS); Antelope Valley, W of Lancaster, N side of Avenue G, 27 Apr 1998, Porter 11834 (CAS, RSA); Hwy. 138 (West Ave. D) W of Lancaster, NE corner of intersection with 40th St. W., 11 May 2005, Gowen 309 (JEPS); Hwy 138 (West Ave. D) W of Lancaster, areas on both sides of the road at the intersection with 30th St. West, 21 May 2005, Gowen 351 (JEPS); intersection of Hwy 138 (W. Ave. D) and 40th St. W. on the SW corner, 8 Jun 2005, Gowen 412 (JEPS); 40th St. West and Avenue D, 12 May 2010, Gowen 1111 (JEPS).

Distribution.—The presently known distribution covers only a several mile area between Rosamond and Lancaster. It is centered near the intersection of Hwy 14 and Hwy 138 (West Avenue D), near the northern border of Los Angeles County. Such a small area of occurrence for *E. rosamondense* makes this a rare plant deserving of conservation.

Discussion.—Plants now proposed as *E. rosamondense* have been known from the Lancaster area from at least 1892. A mixed collection of this plant and *E. sapphirinum*, by Davidson (RSA 469271) in that year, and a Brandegee collection in 1909 (UC 130872), are known to the author. These collections have been referred to *E. diffusum* in the past. A collection by R. Hoffman, 29 Apr 1930 (CAS 178681) has been variously attributed to *Gilia filifolia* var. *diffusa* [*E. diffusum*], annotated as “sp” by Harrison, and annotated by Hoover as *E. hooveri*. More recently, plants from near Lancaster were attributed to *E. hooveri* (Boyd & Porter 1999). All of these collections represent *E. rosamondense*. There is one known occurrence of *E. hooveri* from 7 km east of Isabella Lake, a low valley near the southern end of the Sierra Nevada (Gowen 945), but *E. hooveri* is otherwise not known from east of the San Joaquin Valley. It does not occur in the Mojave Desert.

The small flowers of *E. rosamondense* are easily confused with *E. hooveri*, but the pale blue flowers and exserted stamens of *E. rosamondense* distinguish the two species. More problematic is the relationship with *E. diffusum*. Structurally, *E. rosamondense* is like a miniature of *E. diffusum*, and its placement as a subspecies of that taxon was considered. However, *E. diffusum* does not occur closer than 100 km to the east, in San Bernardino County. In addition, the leaves of *E. rosamondense* are entire, whereas *E. diffusum* most often has leaves with a pair of lateral lobes.

Etymology.—The specific epithet refers to the Rosamond Dry Lake area between Lancaster and Rosamond.

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